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| APPLICATION NO.      | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------|-------------|----------------------|---------------------|------------------|
| 10/578,055           | 07/27/2006  | Richard I. Masel     | 1201.68586          | 4911             |
| 24978                | 7590        | 07/30/2009           |                     |                  |
| GREER, BURNS & CRAIN |             |                      | EXAMINER            |                  |
| 300 S WACKER DR      |             |                      |                     | WILLS, MONIQUE M |
| 25TH FLOOR           |             |                      | ART UNIT            | PAPER NUMBER     |
| CHICAGO, IL 60606    |             |                      | 1795                |                  |
|                      |             |                      |                     |                  |
|                      |             |                      | MAIL DATE           | DELIVERY MODE    |
|                      |             |                      | 07/30/2009          | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                  |              |
|------------------------------|------------------|--------------|
| <b>Office Action Summary</b> | Application No.  | Applicant(s) |
|                              | 10/578,055       | MASEL ET AL. |
|                              | Examiner         | Art Unit     |
|                              | Monique M. Wills | 1795         |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### **Status**

1) Responsive to communication(s) filed on 09 January 2009.  
 2a) This action is **FINAL**.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### **Disposition of Claims**

4) Claim(s) 1-16, 19-31 and 33-42 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-16, 19-31 and 33-42 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### **Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 02 May 2006 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### **Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### **Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 1/9/09.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_.

DETAILED ACTION

This Office Action is responsive to the Amendment filed January 9, 2009. The statuses of rejections are as follows:

- Claims 3-5 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is overcome.
- Claims 1, 2 & 7-15, 17-19, 21-26, 27-30 & 32-4 rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 is overcome.
- The cover sheet filing date indicating April 13, 2004 was in error. The date should have been May 2, 2006. Claims 34-41 have been considered and are rejected below. All pending claims including claims 3-6, 16, 19-29 and 31-32 have been clearly rejected below.
- Claim 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 in view of Lawrence et al. U.S. Pub. 2002/0197522 is overcome.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16, 19, 21-31 & 33-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 in view of Ha et al. (J. Power Source 112 (2002) 655-659).

With respect to claims 1 & 21,37, Hampden-Smith teaches a fuel cell comprising: an anode to which said fluid fuel is directed, said anode having an electrocatalyst associated therewith, said electrocatalyst comprising palladium nanoparticles; a cathode to which said fluid oxidant is directed, said cathode electrically connected to said anode; and an electrolyte interposed between said anode and said cathode. See Paragraphs 6 & 102. With respect to claims 6, 7 & 27-29, 41 the catalyst is Pd nanoparticles on a carbon support. See paragraphs 108-109 & 102. With respect to claims 8-9, 38-39 the palladium catalyst nanoparticles have a diameter of 1 to 10 nm. See paragraph 102. With respect to claim 22, the fuel cell includes a proton-conducting membrane

having opposing first and second surfaces; a cathode catalyst on the second membrane surface and an anode catalyst including Pd on the first surface. See Paragraphs 6 & 102 and See figure 1. With respect to claim 23. the electrolyte is an ion exchange membrane such as a proton exchange membrane. See paragraphs 6 & 93. With respect to claim 24, the proton exchange membrane comprises a perfluorosulfonic acid ionomer (par. 93). With respect to claims 2, 3, 4, 5, 16, 25 , 26 & 31, the catalyst may include Pd, Cr, Mo, W,V, Nb, B, Sr, Au and Hf. See paragraph 109–110. With respect to claim 10, the chloride reduction process, is a process limitation in a product claim. The limitation has been considered but has not been given patentable weight. “ [E]ven though product–by–process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product–by–process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). With respect to claim 26, the catalyst is Au. See paragraph 110. With respect to claims 33–34, the catalyst is directly adjacent an electrically conductive nickel mesh. See paragraph 380. With respect to claims 35, 36 & 40 the Pd nanoparticles have a surface area of 25 m<sup>2</sup>/g. See

paragraph 130. With respect to claims 16 & 31, Au and Pd may be supported on carbon. The reference it teaches at paragraph 110, that a mixture of different catalyst including Pd and Au may be supported on carbon.

Hampden-Smith does not expressly disclose: formic acid fuel (claims 1, 21 & 22, ); 10% to 40% formic acid (claims 1, 19, 22, 21 & 42); the specific weight percents and dispersion of palladium in the catalyst (claims 11-15 & 30).

Ha teaches the use of methanol and formic acid as the fuel for fuel cells, wherein the fuel cell comprises an anode, cathode and solid polymer electrolyte. The use of a 9M formic acid and methanol can increase the current at 60 degrees C from 95 to 320 mA/cm<sup>2</sup> at 0.3 V. The maximum power density increases from 33 to 119 mW/cm<sup>2</sup>. See abstract, page 655-656.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ formic acid in the fuel cell of Hampden-Smith as taught by Ha, in order to increase the current and maximum power density.

With respect to claims 11-15 & 30, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the instant palladium weight and dispersion percents, since it has been held

that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the concentration of palladium directly effects reaction speed in the cell.

With respect to claims 1, 19, 22, 21 & 42, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the formic acid concentration of 25% to 40%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes that the concentration of fuel directly effects utilization of the catalyst material.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. U.S. Pub. 2006/0292434 in view of in view of Ha et al. (J. Power Source 112 (2002) 655–659) and further in view of Lawrence et al. U.S. Pub. 2002/0197522.

Hampden-Smith in view of Ha teach a fuel cell as described in the rejection recited hereinabove. However, the reference does not expressly disclose a replaceable fuel cartridge.

However, Lawrence teaches that it is well known in the art to employ fuel cartridges. See the Abstract.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the fuel cartridge of Lawrence in the fuel cell of Hampden-Smith, in order to power portable electronic devices.

*Response to Arguments*

Applicant's arguments with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Patrick Ryan, may be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Monique M Wills/

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795